

**FACT SHEET FOR NPDES
PERMIT NO. WA-002060-5**

**CITY OF CHELAN
PUBLICLY-OWNED TREATMENT WORKS**

SUMMARY

The City of Chelan is seeking reissuance of the NPDES Permit for its regional publicly-owned treatment works (POTW). The City is located in north-central Washington, in Chelan County, at the southern end of Lake Chelan. The POTW provides wastewater treatment to customers within the City and along the southern shores of the lake.

The Chelan POTW consists of a collection system for the north and south shores of Lake Chelan and primary and secondary treatment plants. The City has operating agreements with sewer districts in outlying areas to provide wastewater treatment to these incorporated and unincorporated areas. The POTW accomplishes secondary-level wastewater treatment utilizing rotating biological contactors. Disinfected effluent is discharged to the nearby Columbia River. As a result of the revision of Chapter 173-230 of the Washington Administrative Code (WAC), the classification of the treatment plant was changed from Class II to Class III.

In 1998, the City began a comprehensive planning effort to upgrade and expand its capital facilities, in order to accommodate expected high population growth. Two products of this effort are the 1998 *General Sewer Plan* and the 1999 *Wastewater Facility Plan*. Both documents have been approved by the Department. At this time, some improvements have been made to the collection system, significantly reducing infiltration. During the current permit cycle the City has procured and installed additional rotating biological contactors, which has increased plant loading capacity. In addition, the City has largely decommissioned the older primary treatment plant, redesigned the biological treatment processes to be more efficient, and installed ultraviolet disinfection. Phase 1 of the *Facility Plan* is ahead of schedule with most improvements completed in 2003. Phase 2 is due for completion in 2018.

This permit requires compliance with effluent limitations and monthly submittal of discharge monitoring reports (DMRs). In addition, the permit requires submittal of periodic wasteload assessments and infiltration and inflow (I&I) evaluations.

The Permittee is cautioned that all permit conditions, including effluent limitations and dilution factors, are subject to change. Although the criteria for modifying or revoking a permit are detailed in State and Federal regulations, see General Condition G3, actions of the National Marine Fisheries Service to protect endangered species present in the Columbia River may require changes in this permit before its expiration.

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INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), which is administered by the Environmental Protection Agency (EPA). The EPA has authorized the State of Washington to administer the NPDES permit program. Chapter 90.48 RCW defines the Department of Ecology's authority and obligations in administering the wastewater discharge permit program.

The regulations adopted by the State include procedures for issuing permits (Chapter 173-220 WAC), technical criteria for discharges from municipal wastewater treatment facilities (Chapter 173-221 WAC), water quality criteria for surface and ground waters (Chapters 173-201A and 200 WAC), and sediment management standards (Chapter 173-204 WAC). These regulations require that a permit be issued before discharge of wastewater to waters of the State is allowed. The regulations also establish the basis for effluent limitations and other requirements which are to be included in the permit. One of the requirements (WAC 173-220-060) for issuing a permit under the NPDES permit program is the preparation of a draft permit and an accompanying fact sheet. Public notice of the availability of the draft permit is required at least thirty days before the permit is issued (WAC 173-220-050). The fact sheet and draft permit are available for review (see Appendix A--Public Involvement of the fact sheet for more detail on the Public Notice procedures).

The fact sheet and draft permit have been reviewed by the Permittee. Errors and omissions identified in this review have been corrected before going to public notice. After the public comment period has closed, the Department will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the permit and parties submitting comments will receive a copy of the Department's response. The fact sheet will not be revised. Comments and the resultant changes to the permit will be summarized in Appendix D--Response to Comments.

GENERAL INFORMATION	
Applicant	City of Chelan
Facility Name and Address	City of Chelan Publicly-Owned Treatment Works 317 E. Johnson Avenue Chelan, WA 98816
Type of Treatment	Primary Plant: Grit Removal and Influent Screening Secondary Plant: Rotating Biological Contactors, Aerobic Digestion and UV Disinfection
Discharge Location	Columbia River, River Mile 503.5 Latitude: 47° 48' 29" N Longitude: 119° 58' 38" W
Water Body ID Number	WA-CR-1040

BACKGROUND INFORMATION

DESCRIPTION OF THE FACILITY

The City of Chelan is located at the southeast end of Lake Chelan, just west of the Columbia River, approximately 37 miles north of Wenatchee, Washington. The main, 'secondary' treatment plant is located 2 miles southeast of the City, on the west bank of the river. The original, 'primary' treatment plant is located within the City limits.

The City of Chelan owns and operates the wastewater treatment facilities that serve the City, the Lake Chelan Sewer District (LCSD), and the Lake Chelan Reclamation District (LCRD). The LCSD serves the south shore of the lake. The LCRD serves the north shore. Several agreements for the conveyance and treatment of sewage were signed over the years between the LCSD, LCRD, Chelan County, and the Chelan County Public Utility District, and the City.

During the 1995-2000 permit cycle the City conducted extensive capital facilities planning activities in response to the State Growth Management Act. The City predicted significant population growth during the next twenty years and, in order to address existing deficiencies and at the same time accommodate the infrastructural requirements of such growth, the City initiated the planning activities. The two documents generated by these activities that are relevant to the regional wastewater treatment system and this permit are the *City of Chelan General Sewer Plan* and the *City of Chelan Wastewater Facility Plan*. Both plans have been approved by the

Department. Much of the information in this fact sheet and the associated permit are based on the contents of these two planning documents.

During the previous permit cycle the City completed significant portions of the Phase 1 upgrade plans, which will be discussed later in this document.

Collection System Status

The City of Chelan's original sanitary sewer system was first constructed about 1915 and consisted of a series of trunks and laterals that served the present downtown area. In 1948 the collection system was extended to include the surrounding developed area as well as the developed portion of the City on the south shore of Lake Chelan. Another major expansion of the sewer system took place in 1956 when the collection system was extended to the developed areas to the east, west, and north of the City. The City also owns and operates a limited storm water sewer system, constructed in the early 1970s, that serves the Central Business District and discharges into Lake Chelan.

The City's collection system consists of 22 miles of gravity sewers, 8 miles of forcemain, and 12 lift stations, of which two were added in 2002. Many of the older lift stations were constructed in the late 1950s and upgraded by the City during the early 1960s.

The *General Sewer Plan* identified numerous deficiencies of the City's collection system. Many of the recommended improvements are contingent on whether existing and potential housing developments are annexed into the service area. The following paragraphs briefly describe some of the main deficiencies of the City's collection system that have resulted in impacts to water quality. More detailed and comprehensive information may be found in Chapter 5 of the *General Sewer Plan*.

North Shore (City and LCRD)

The LCRD maintains a sewer system on the north side of the lake that serves the Manson and Lakeshore areas. The North Shore Interceptor was constructed in 1976 and consists of 7 miles of sewers and 7 lift stations.

There have been numerous breaks in the North Shore Interceptor forcemain, some of the incidents resulting in spills of sewage to the lake. In the summer of 1995 approximately 1,000 feet of the more problematic section of forcemain was replaced and another 2,000-foot segment was replaced in 1999. An upgrade consisting of a 12" and 10" line to the pump station to Manson from Chelan is currently underway. The PUD plans to retrofit the pump station in 2005.

South Shore (LCSD)

Sewage from the LCSD is treated by the City of Chelan. The LCSD collection system was constructed in 1959 and consists of more than three miles of asbestos-cement sewers that are buried along the south shore of the lake. The system utilizes five lift stations to convey sewage to the City's collection system.

In 1999 the PUD replaced the low-pressure asbestos-cement forcemain which serves six LCSD lift stations with a new HDPE line. The line is buried in the lake bottom and is under water in the summer during high lake levels. Historically, this segment of sewer contributed significantly to the large amounts of infiltration that occurred in the system. It is estimated that replacement of this segment of pipe reduced infiltration to the system by approximately 160,000 gallons per day during the maximum month.

South Shore (City)

Localized sections of sewer are operating at or near capacity and are scheduled to be replaced. In addition, several lift stations are equipped with outdated pumps and will be upgraded or completely replaced.

Urban Core

Although the collection system serving Chelan's urban core is generally adequate for the immediate future, the City plans to upgrade some 18-inch sewer pipes with 27-inch pipes within the 20-year planning horizon. In addition, Lift Station # 1 will be improved, and possibly a new lift station will be constructed in the area.

Inflow and Infiltration

The July 15, 2004 Wasteload Assessment Report describes I&I as marginal for a system of this size. Due to the extreme variability in population between the summer and winter deriving an average I&I value against the design criteria is difficult. Based on the analysis the sewer system does experience some I&I however, the relatively small amount of inflow does not adversely affect any of the waste treatment processes.

Existing Treatment Facilities

Treatment processes at the primary plant include grit removal and influent screening. The effluent is then pumped to the secondary plant at Chelan Falls. The primary and secondary treatment plants are connected by a 2.5 mile pipeline. Treatment processes at the secondary plant include rotating biological contactors (RBCs), secondary clarification, UV disinfection, an outfall to the Columbia River, aerobic digesters, a sludge dewatering system and drying beds.

Descriptive information contained in this section, and much of the fact sheet, was taken from *City of Chelan Wastewater Facility Plan*. The following paragraphs briefly describe the capacity, overall condition and remaining useful life of the collection system and each existing unit process at the primary and secondary treatment plants. The assessments in the plan are based on design year of 2021. A more detailed and comprehensive description of the existing and proposed treatment works can be found in the *Facility Plan*.

Wastewater treatment begins with degritting and screening of influent at the primary treatment plant. The plant's headworks is equipped with two aerated grit chambers and two rotary self-cleaning influent screens. Although there is currently no redundant grit handling equipment for use in the event of a mechanical failure, the assessment conducted for the *Facility Plan* found the existing structures and equipment associated with grit removal to be in good condition and should continue to provide years of relatively trouble-free use. However, the design capacity of the influent screens is expected to be reached in the year 2016 (p. 5-3).

Screened wastewater continues through an underground pipe to the lift station and then to the secondary plant. The flow meter consists of a 12-inch Parshall flume and an ultrasonic level sensor. By changing the calibration of the ultrasonic sensor, the existing influent flow meter will have adequate capacity through the design year 2021.

Screened influent flow enters the transfer lift station to be pumped to the secondary treatment plant. Partially treated wastewater enters the wet well of the station and is transferred to the secondary treatment plant using 1-50hp and 3-10hp centrifugal pumps. The wet well is relatively small and has historically resulted in short cycling of the pumps. This is no longer a problem as two of the pumps were equipped with variable frequency drives and controls in 2001.

The lift station is capable of accommodating a peak hourly flow of only 3.0 MGD, which is significantly less than the plant design peak hour flow of 4.4 MGD. The lift station is expected to reach its design capacity by the year 2010 (p. 5-6). The Facilities Plan (p. 5-7) recommends construction of a second force main before peak hour flows exceed 3.0 MGD.

Partially treated wastewater enters the secondary treatment plant through the Parshall Flume to the primary clarifier. Wastewater is then split evenly between 4 trains of RBCs with each train consisting of 4 RBCs. Each train of RBCs consists of two standard density and two high density media shafts with about 40 percent of their volume submerged in the flowing wastewater. Low pressure air provided by centrifugal blowers is used to enhance treatment and provide air for the RBC air drive system. The design and permitted maximum monthly capacity of the existing RBC process is 2,200 lbs/day of BOD₅. Historically, the RBC system has received loadings as high as 2,800 lbs/day. The plan recommends additional capacity be constructed as part of the Phase II treatment plant upgrade. The plan concludes that, if properly operated and maintained, the existing RBCs should continue to provide many years of reliable service (p. 5-7).

Flows from each RBC are combined in a splitter box and evenly distributed between 3 secondary clarifiers.

Secondary effluent from the clarifiers is combined and flow through an underground pipe to a concrete flow measurement chamber equipped with a 6-inch Parshall flume, where the backup high-concentration chlorine solution can be injected to begin the chlorine disinfection process. Flow continues through the backup chlorine contact tank splitter box where the flow is evenly distributed between two UV disinfection tanks. The UV system has a backup generator. An ultrasonic level sensor continuously measures the upstream water depth to determine the flow rate through the flume.

Treated effluent overflows each tank and is conveyed through a 16-inch ductile iron outfall pipe to a submerged diffuser in the Columbia River. The diffuser consists of a 20-foot length of 16-inch diameter HDPE piping, 2-inch diameter diffuser ports spaced 1-foot at center, oriented in the downstream direction of river flow. The *Facility Plan* (p. 5-11) assumes the diffuser will reach its design capacity by the year 2018

The City recently completed construction of sludge dewatering facilities at the secondary treatment plant site, which includes; a dewatering centrifuge, a sludge pump, a polymer feed system, dry solids conveyor, covering over one of the existing drying beds, and supporting systems.

The sludge dewatering system includes a sludge pump, dry solids centrifuge, dewatered sludge conveyor, and dry polymer preparation/feed system. The system is capable of processing the aerobically digested sludge generated by the secondary plant. After sludge is treated to Class B standards, it is dried in the onsite drying beds, and land applied at agricultural sites in Douglas County managed by Boulder Park Incorporated (BPI) in accordance with the King County/BPI *Site Specific Land Application Plan*. The facility biosolids is in compliance with their Washington State Biosolids Permit.

Paved sludge drying beds are available at the primary and secondary plant sites. these drying beds will only be used for drying liquid sludge in the event of a long-term mechanical failure of the sludge dewatering system.

Approved Treatment Plant Upgrade

The City chose to implement improvements to its wastewater treatment facilities in two phases. Completion of Phase I improvements should provide adequate capacity to accommodate projected flows and loadings through the year 2009. Completion of Phase II improvements will increase the rated capacity of the treatment facilities to accommodate flows and loadings until the year 2021. The upgrade of the main treatment process, the RBCs, is described in some detail in the following paragraphs. Further information may be found in Chapter 6 of the *Facility Plan*.

The Phase I upgrade is focused around expanding biological treatment capacity at the secondary plant. The City recently installed four additional standard density and four additional high density RBC shafts, including fiberglass covers, from the City of Puyallup. By constructing facilities and installing the eight additional RBCs, the upgraded treatment plant is now capable of treating approximately 2,800 lbs/day of influent BOD₅.

In addition, the City has enhanced treatment capacity of the upgraded plant by recirculating secondary sludge from the clarifiers to the primary clarifier. They also have the capability to recirculate secondary sludge to the front of the RBC bank, thereby wasting sludge regularly to maintain a stable mixed liquor concentration within the RBC tanks. This modification increases the mass of active biomass available to provide biological treatment, thus increasing treatment efficiency. This modification results in a BOD₅ influent loading capacity of 5,750 lbs/day. The new design required replacement of the existing air-operated diaphragm secondary sludge pumps with centrifugal sludge pumps, and installation of new sludge piping.

Completed improvements to other treatment plant processes as described in the *Facility Plan*, pages 6-5 to 6-15 include:

- Installation of a new 12-inch Parshall flume with an ultrasonic level sensor to measure influent flow;
- Modifying the existing grit chambers at the primary plant to optimize performance;
- Installation of two new primary clarifiers at the secondary plant, the first is installed and the second will be during Phase II;
- Upgraded transfer pump station at primary plant and a new 12-inch forcemain to convey sewage to the secondary plant;
- Installation of two new secondary clarifiers at the secondary plant, the first is installed and the second will be during Phase II;
- Installation of a vertical, low-pressure ultraviolet (UV) disinfection system is complete and expansion of the system will occur during Phase II;
- Modification of the diffuser to accommodate higher effluent flows is complete.

Phase II improvements will also include:

- Installation of screening and degritting systems at the secondary plant;
- Installation of a new 9-inch Parshall flume effluent flow meter, which was not completed as part of Phase I.

Transfer pumping now occurs at the primary plant, and all other treatment processes except degritting/screening occur at the secondary plant. In addition, all sludge generated by the facility will be treated to Class B biosolids standards utilizing aerobic digestion. One aerobic digestion tank has been constructed during Phase I and two additional tanks will be constructed during Phase II (*Facility Plan*, p. 6-22).

The upgraded treatment plant was designed to allow the addition of further treatment processes to meet possible future NPDES permit requirements, such as complete nitrification, denitrification, and phosphorus removal. To address the first two possible requirements, space was preserved in the plant configuration to construct fixed film towers or anoxic tanks. In the case of phosphorus, provision was made for removal by chemical precipitation in the primary clarifiers, with space for chemical storage and feed equipment in the new headworks building, to be constructed at the secondary plant during Phase II (*Facility Plan*, p. 6-34).

Treatment Plant Classification and Operator Certification

The operator in responsible charge must be certified by the State as, at least, a Class III operator.

Discharge Outfall

Final disinfected effluent from each UV tank is conveyed through a 16-inch ductile iron outfall pipe to a submerged diffuser in the Columbia River. The diffuser consists of a 20-foot length of 16-inch diameter HDPE piping, 2-inch diameter diffuser ports spaced approximately 1-foot at center, oriented in the downstream direction parallel to the flow of river flow. The *Facility Plan* assumes the diffuser will reach its design capacity by the year 2018 (p. 5-11)

Industrial Users

According to the information provided by the applicant, there are no industrial users discharging to the applicant's sewer collection system.

Residual Solids

To prevent water quality problems, the Permittee is required in Special Condition S7. to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080 and State Water Quality Standards.

The final use and disposal of sewage sludge from this facility is regulated by U.S. EPA under 40 CFR 503, and by Ecology under Chapter 173-308 WAC, "Biosolids Management". The disposal of other solid waste is under the jurisdiction of the Chelan County Health Department.

Sludge handling and treatment facilities at the primary plant consist of anaerobic digestion and drying beds. Digested sludge at the primary plant is transferred to onsite paved drying beds prior to removal from the site to an approved agricultural land application site. The digester system is rapidly approaching its design capacity and the *Facility Plan* recommends construction of additional capacity (p. 5-13).

The City recently completed construction of sludge dewatering facilities at the secondary treatment plant site, which include a dewatering centrifuge, sludge pump, polymer feed system, dry solids conveyor, a cover over one of the existing drying beds, and supporting systems. The aerobic digestion system utilizes two rectangular concrete cells. Aeration and mixing is provided by a submerged turbine aerator supplied with low pressure air by positive displacement blowers.

The sludge dewatering system includes a sludge pump, dry solids centrifuge, dewatered sludge conveyor, and dry polymer preparation/feed system. The system is capable of processing the aerobically digested sludge generated by the secondary plant.

Class B treatment is currently achieved by air drying partially-treated sludge in onsite drying beds. After sludge is treated to Class B standards, it is dried in the onsite drying beds, and land applied at an agricultural site.

PERMIT STATUS

The previous permit for this facility was issued on April 22, 2000. The previous permit placed effluent limitations on 5-day Biochemical Oxygen Demand (BOD₅), Total Suspended Solids (TSS), pH, Fecal Coliform bacteria, and Total Residual Chlorine.

An application for permit renewal was received by the Department on July 28, 2004 and accepted by the Department on August 4, 2004.

SUMMARY OF COMPLIANCE WITH THE PREVIOUS PERMIT

A compliance inspection without sampling was conducted on August 13, 2004.

During the history of the previous permit, the Permittee has remained in compliance, based on Discharge Monitoring Reports (DMRs) submitted to the Department and inspections conducted by the Department. During the previous permit, effluent quality has consistently been excellent.

The Permittee has experienced numerous problems with spills of sewage from failing portions of the collection system. Most spills were relatively minor, less than 100 gallons, but a few of the incidents resulted in significant spills of thousands of gallons to the lake and ground. The City's *General Sewer Plan* contains a detailed program to correct collection system deficiencies and the City has recently replaced some of the most problematic segments of pipe.

WASTEWATER CHARACTERIZATION

Influent

Loadings to the POTW were reported in DMRs submitted to the Department and are compared with the applicable Phase I design criteria as follows:

Table 1: Influent Characterization

Parameter	January 2001 to July 2004 Characterization		Design Criteria	Maximum Month % of Design Criteria
	Average	Highest Monthly Average	Monthly Average for the Maximum Month	
FLOW MGD	0.80	1.3	1.77	73.4
BOD ₅ , in lbs/day	1355.5	3572	3862	92.5 ¹
TSS, in lbs/day	1910.2	3494	4439	78.7

¹ Highest monthly average of 3572 lb/Day BOD occurred in June of 2001. The second highest month occurred in July 2004 with 2378 lb/Day BOD.

Effluent

The mass loading or concentration of pollutants in the discharge was reported in the NPDES application and in DMRs. The effluent is characterized as follows:

Table 2: Effluent Characterization

Parameter	January 2001 to July 2004 Characterization			Existing Permit Limits	
	Average	Highest Monthly Average	Highest Weekly Average	Monthly Average	Weekly Average
BOD ₅ , in lbs/Day	76.4	162	231	368	552
TSS, in lbs/Day	71.9	151	209	368	552
Fecal Coliform Bacteria, in #colonies/100 mL	21.7	90	127	200	400
Ammonia, in mg/L	2.8	8	9.9	Not limited	Not limited
pH Std. Units	7.2 Maximum		6 Minimum	9 Maximum	6 Minimum

The City, to date, has not listed any industrial users and given the low concentrations found in the effluent has not required the City to provide a priority pollutant scan during the previous permit term. However, the proposed permit will require a priority pollutant scan with their application for permit renewal.

PROPOSED PERMIT LIMITATIONS

Federal and State regulations require that effluent limitations set forth in a NPDES permit must be either technology- or water quality-based. Technology-based limitations for municipal discharges are set by regulation (40 CFR 133, and Chapters 173-220 and 173-221 WAC). Water quality-based limitations are based upon compliance with the Surface Water Quality Standards (Chapter 173-201A WAC), Ground Water Standards (Chapter 173-200 WAC), Sediment Quality Standards (Chapter 173-204 WAC) or the National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992.) The most stringent of these types of limits must be chosen for each of the parameters of concern. Each of these types of limits is described in more detail below.

The limits in this permit are based in part on information received in the application. The effluent constituents in the application were evaluated on a technology- and water quality-basis. The limits necessary to meet the rules and regulations of the State of Washington were determined and included in this permit. Ecology does not develop effluent limits for all pollutants that may be reported on the application as present in the effluent. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation. Effluent limits are not always developed for pollutants that may be in the discharge but not reported as present in the application. In those circumstances the permit does not authorize discharge of the non-reported pollutants. Effluent discharge conditions may change from the conditions reported in the permit application. If significant changes occur in any constituent, as described in 40 CFR 122.42(a), the Permittee is required to notify the Department of Ecology. The Permittee may be in violation of the permit until the permit is modified to reflect additional discharge of pollutants.

DESIGN CRITERIA

In accordance with WAC 173-220-150 (1)(g), flows or waste loadings shall not exceed approved design criteria.

The design criteria for this treatment facility are taken from *City of Chelan Wastewater Facility Plan* engineering report prepared by Grey and Osborne and are as follows:

Current Design Criteria for the City of Chelan WWTP

Parameter	Phase I
Maximum monthly flow (MGD)	1.77
Maximum daily flow (MGD)	2.13
Peak hourly flow (MGD)	2.93
BOD ₅ influent loading, maximum month (lbs/day)	3,862
TSS influent loading, maximum month (lbs/day)	4,439

Proposed Phase II Design Criteria for the City of Chelan WWTP

Parameter	Phase II
Maximum monthly flow (MGD)	2.66
Maximum daily flow (MGD)	3.19
Peak hourly flow (MGD)	4.40
BOD ₅ influent loading, maximum month (lbs/day)	5,790
TSS influent loading, maximum month (lbs/day)	6,655

TECHNOLOGY-BASED EFFLUENT LIMITATIONS

Municipal wastewater treatment plants are a category of discharger for which technology-based effluent limits have been promulgated by Federal and State regulations. These effluent limitations are given in the 40 CFR Part 133 (Federal) and in Chapter 173-221 WAC (State). These regulations are performance standards that constitute "all known available and reasonable methods of prevention, control, and treatment" (AKART) for municipal wastewater.

pH	shall be within the range of 6.0 to 9.0 standard units.
Fecal Coliform Bacteria	Monthly Geometric Mean = 200 colonies/100 ml Weekly Geometric Mean = 400 colonies/100 ml
BOD₅	Average Monthly Limit is the most stringent of the following: = 30 mg/L; or = may not exceed fifteen percent (15%) of average influent concentration. Average Weekly Limit = 45 mg/L
TSS	Average Monthly Limit is the most stringent of the following: = 30 mg/L; or = may not exceed fifteen percent (15%) of average influent concentration. Average Weekly Limit = 45 mg/L

The following technology-based limitations are based on WAC 173-220-130(3)(b) and 173-221-030(11)(b). Effluent mass loading limits (lbs/day) were calculated as follows:

BOD₅ Monthly Average Effluent Mass Loading Limit =	Average Design Flow x Effluent Concentration Limit x Conversion Factor =	1.77 MGD x 30 mg/L x 8.34 =	442.9 lbs/day
TSS Monthly Average Effluent Mass Loading Limit =	Average Design Flow x Effluent Concentration Limit x Conversion Factor =	1.77 MGD x 30 mg/L x 8.34 =	442.9 lbs/day
BOD₅ Weekly Average Effluent Mass Loading Limit =	Average Design Flow x Effluent Concentration Limit x Conversion Factor =	1.77 MGD x 45 mg/L x 8.34 =	664.3 lbs/day
TSS Weekly Average Effluent Mass Loading Limit =	Average Design Flow x Effluent Concentration Limit x Conversion Factor =	1.77 MGD x 45 mg/L x 8.34 =	664.3 lbs/day

In the unlikely event backup power generation fails and the backup chlorination system is required to operate, the following technology-based limitations under WAC 173-221-040 (c) are considered to be AKART for RBC secondary treatment facilities:

Parameter	Daily Maximum	Monthly Average
Total Residual Chlorine	1.00 mg/L, 14.8 lbs/day	0.50 mg/L, 7.4 lbs/Day

SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS

In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established Surface Water Quality Standards. The Washington State Surface Water Quality Standards (Chapter 173-201A WAC) is a State regulation designed to protect the beneficial uses of the surface waters of the State. Water quality-based effluent limitations may be based on an individual waste load allocation (WLA) or on a WLA developed during a basin-wide total maximum daily loading study (TMDL).

Numerical Criteria for the Protection of Aquatic Life

"Numerical" water quality criteria are numerical values set forth in the State of Washington's Water Quality Standards for Surface Waters (Chapter 173-201A WAC). They specify the levels of pollutants allowed in a receiving water while remaining protective of aquatic life. Numerical criteria set forth in the Water Quality Standards are used along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limitations, they must be used in a permit.

Numerical Criteria for the Protection of Human Health

The State was issued 91 numeric water quality criteria for the protection of human health by the U.S. EPA (EPA 1992). These criteria are designed to protect humans from cancer and other disease and are primarily applicable to fish and shellfish consumption and drinking water from surface waters.

Narrative Criteria

In addition to numerical criteria, "narrative" water quality criteria (WAC 173-201A-030) limit toxic, radioactive, or deleterious material concentrations below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health. Narrative criteria protect the specific

beneficial uses of all fresh (WAC 173-201A-130) and marine (WAC 173-201A-140) waters in the State of Washington.

Antidegradation

The State of Washington's Antidegradation Policy requires that discharges into a receiving water shall not further degrade the existing water quality of the water body. In cases where the natural conditions of a receiving water are of lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. Similarly, when receiving waters are of higher quality than the criteria assigned, the existing water quality shall be protected. More information on the State Antidegradation Policy can be obtained by referring to WAC 173-201A-070.

The Department has reviewed existing records and is unable to determine if ambient water quality is either higher or lower than the designated classification criteria given in Chapter 173-201A WAC; therefore, the Department will use the designated classification criteria for this water body in the proposed permit. The discharges authorized by this proposed permit should not cause a loss of beneficial uses.

Critical Conditions

Surface water quality-based limits are derived for the waterbody's critical condition, which represents the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or characteristic water body uses.

Mixing Zones

The Water Quality Standards allow the Department of Ecology to authorize mixing zones around a point of discharge in establishing surface water quality-based effluent limits. Both "acute" and "chronic" mixing zones may be authorized for pollutants that can have a toxic effect on the aquatic environment near the point of discharge. The concentration of pollutants at the boundary of these mixing zones may not exceed the numerical criteria for that type of zone. Mixing zones can only be authorized for discharges that are receiving all known, available, and reasonable methods of prevention, control and treatment (AKART) and in accordance with other mixing zone requirements of WAC 173-201A-100.

The National Toxics Rule (EPA, 1992) allows the chronic mixing zone to be used to meet human health criteria.

Description of the Receiving Water

The facility discharges to the Columbia River, which is designated as a Class A receiving water in the vicinity of the outfall. This segment of the Columbia River is listed on the Department's 303(d) list as water quality-impaired for total dissolved gas. Characteristic uses include the following:

Water supply (domestic, industrial, agricultural); stock watering; fish migration; fish rearing, spawning and harvesting; wildlife habitat; primary contact recreation; sport fishing; boating and aesthetic enjoyment; commerce and navigation.

Water quality of this class shall meet or exceed the requirements for all or substantially all uses.

Surface Water Quality Criteria

Applicable criteria are defined in Chapter 173-201A WAC for aquatic biota. In addition, U.S. EPA has promulgated human health criteria for toxic pollutants (EPA 1992). Criteria for this discharge are summarized below:

Table 5: Applicable Water Quality Criteria

Parameter	Criterion
Fecal Coliforms	100 organisms/100 mL maximum geometric mean
Dissolved Oxygen	8 mg/L minimum
Temperature	18 degrees Celsius maximum or incremental increases above background
pH	6.5 to 8.5 standard units
Turbidity	less than 5 NTUs above background
Toxics	No toxics in toxic amounts (see Appendix C for numeric criteria for toxics of concern for this discharge)

CONSIDERATION OF SURFACE WATER QUALITY-BASED LIMITS FOR NUMERIC CRITERIA

Pollutant concentrations in the proposed discharge exceed water quality criteria with technology-based controls which the Department has determined to be AKART. A mixing zone is authorized in accordance with the geometric configuration, flow restriction, and other restrictions for mixing zones in Chapter 173-201A WAC and are defined as follows:

Dilution Factor Estimation

When pollutant concentrations in the proposed discharge exceed water quality criteria with technology-based controls which the Department has determined to be AKART, mixing zones may be authorized in accordance with Chapter 173-201A WAC.

A mathematical model was used to determine the dilution factors of effluent to receiving water that occur within the allowable mixing zones at the critical condition. The dilution factors determined were then compared with those based on the allowable river flow percentages (WAC 173-201). RIVPLUM5 model was used to determine the dilution factors at the boundaries of the allowable mixing zone. RIVPLUM5 is a two dimensional model based on the assumption that the discharge is a single point source and is completely and rapidly mixed vertically in the receiving river. The predicted acute dilution factors were compared with those calculated based on the 2.5% stream flow. Factors used to model mixing assumed a very conservative flow of 20,000 cfs for the mainstem of the Columbia River. The 7Q10 at Pateros is reported to be 41,000 cfs. The calculated dilution factors were: chronic, **278.6**; acute, **73.5**. These dilution factors were used to determine: 1) potential water quality-based effluent limits for chlorine, and; 2) the reasonable potential analysis for contaminants in the Permittee's discharge to exceed the State's water quality standards. The spreadsheets used to calculate the chronic and acute dilution factors are presented in Appendix C of this fact sheet.

Ammonia Considerations

The Department's standard spreadsheet for calculating the ammonia criteria of a receiving water, NH3FRESH.WK1, determined an acute criteria of 3.7 mg/L and a chronic criteria of 0.66 mg/L. The 95th percentile effluent ammonia concentration for the past five years was 6.7 mg/L.

Based on the Department's assessment of the effluent mixing and dilution in the receiving water, the discharge from this facility does not have a reasonable potential for exceedance of the ammonia criteria outside the allowable mixing zone in the receiving water. The spreadsheets used to calculate the ammonia water quality criteria and the reasonable potential analysis were originally contained in Appendix E of the *Facility Plan* and are reproduced in Appendix C of this fact sheet.

Toxic Pollutants

Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. This process occurs concurrently with the derivation of technology-based effluent limits. Facilities with technology-based effluent limits defined in regulation are not exempted from meeting the Water Quality Standards for Surface Waters or from having surface water quality-based effluent limits.

The City of Chelan lists no industrial users at this time and toxics are not expected in the effluent. Therefore, the Department has not required a priority pollutant scan in the existing permit. However, the Lake Chelan Community growing and the Department believes it is prudent to conduct a priority pollutant scan prior to issuing a permit following the proposed permit. A priority pollutant scan will be required to be submitted with the application for permit renewal.

Human Health

Washington's water quality standards now include 91 numeric health-based criteria that must be considered in NPDES permits. These criteria were promulgated for the State by the U.S. EPA in its National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992).

A determination of the discharge's potential to cause an exceedance of the water quality standards was conducted prior to issuance of the current permit as required by 40 CFR 122.44(d). The reasonable potential determination was evaluated with procedures given in the Technical Support Document for Water Quality-Based Toxics Control (EPA/505/2-90-001) and the Department's Permit Writer's Manual (Ecology Publication 92-109, July, 1994). The determination indicated that inorganic arsenic, methylene chloride, and bis (2 ethylhexyl), phthalate, in the discharge had no reasonable potential to cause a violation of water quality standards, thus an effluent limit was not warranted,

Sediment Quality

The Department has promulgated aquatic sediment standards (Chapter 173-204 WAC) to protect aquatic biota and human health. These standards state that the Department may require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400).

The Department has determined through a review of the discharger characteristics and effluent characteristics that this discharge has no reasonable potential to violate the Sediment Management Standards.

The Permittee has conducted a recent outfall inspection and no sediment deposition was discovered.

GROUND WATER QUALITY LIMITATIONS

The Department has promulgated Ground Water Quality Standards (Chapter 173-200 WAC) to protect uses of ground water. Permits issued by the Department shall be conditioned in such a manner so as not to allow violations of those standards (WAC 173-200-100).

This Permittee has no discharge to ground; therefore, no limitations are required based on potential effects to ground water.

MONITORING REQUIREMENTS

Effluent monitoring, recording, and reporting are required (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and the effluent limitations are being achieved.

The monitoring and testing schedule is detailed in this permit under Special Condition S2. Specified monitoring frequencies take into account the quantity and variability of discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The monitoring schedule is based on the program established during the existing permit cycle.

Monitoring of effluent ammonia is required to establish baseline data to perform the analysis for the facility to exceed the water quality standards for this potentially toxic pollutant. The treatment plant effluent has been routinely analyzed for ammonia. The Department's *Permit Writers Manual* (p. XIII-70) suggests sampling for effluent ammonia at a frequency of twice per week. However, given that the ammonia concentration has been far less than the theoretical effluent limits given in the water quality criteria given the size of the dilution factors, it is in the permit writer's best professional judgment once per week sampling will result in a sufficient data set to accurately determine reasonable potential at reissuance of the permit.

BOD and TSS have been monitored twice per week for the course of the previous permit period. The data is very uniform with a 99th percentile value of 18.6 and a coefficient of variation (COV) of 21.2 for the monthly average and a 99th percentile value of 23.6 and a coefficient of variation (COV) of 24.1 for the weekly average. The TSS value for the 99th percentile is 21.4 for the monthly average with a COV of 33.6 and a 99th percentile of 25.7 with a COV of 29.6 for the weekly average. The above statistical analysis demonstrates there is little chance of a violation of the weekly and monthly limitations for both BOD and TSS. Therefore, in the best professional judgment of the Department, monitoring for BOD and TSS will be reduced to once per week in the proposed permit period. It is understood that the City has the right to test at a greater frequency if it so desires. However, the City must report the results of any additional analysis on its monthly DMR.

LAB ACCREDITATION

With the exception of certain parameters the permit requires all monitoring data to be prepared by a laboratory registered or accredited under the provisions of Chapter 173-50 WAC, *Accreditation of Environmental Laboratories*. The laboratory at this facility is accredited for general chemistry and microbiologic analysis.

OTHER PERMIT CONDITIONS

REPORTING AND RECORDKEEPING

The provisions of Special Condition S3. are based on the authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-220-210).

PREVENTION OF FACILITY OVERLOADING

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require the Permittee to take the actions detailed in Special Condition S4. to plan expansions or modifications before existing capacity is reached and to report and correct conditions that could result in new or increased discharges of pollutants. Special Condition S4. restricts the amount of flow.

OPERATION AND MAINTENANCE (O&M)

The proposed permit contains Special Condition S5. as authorized under RCW 90.48.110, WAC 173-220-150, Chapter 173-230 WAC, and WAC 173-240-080. It is included to ensure proper operation and regular maintenance of equipment, and to ensure that adequate safeguards are taken so that constructed facilities are used to their optimum potential in terms of pollutant capture and treatment.

The Permittee has submitted an updated O&M Manual for the Phase I upgrade, which is in the approval process at time of this writing.

RESIDUAL SOLIDS HANDLING

To prevent water quality problems the Permittee is required in Special Condition S7. to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080 and State Water Quality Standards.

The final use and disposal of sewage sludge from this facility is regulated by U.S. EPA under 40 CFR 503, and by Ecology under Chapter 173-308 WAC, "Biosolids Management". The disposal of other solid waste is under the jurisdiction of the Chelan-Douglas Health District.

WASTEWATER PERMIT REQUIRED

RCW 90.48 and WAC 173-216-040 require SIUs to obtain a permit prior to discharge of industrial waste to the Permittee's sewerage system. This provision prohibits the POTW from

accepting industrial wastewater from any such dischargers without authorization from the Department.

DUTY TO ENFORCE DISCHARGE PROHIBITIONS

This provision prohibits the POTW from authorizing or permitting an industrial discharger to discharge certain types of waste into the sanitary sewer. The first portion of the provision prohibits acceptance of pollutants which cause pass through or interference. The definitions of pass through and interference are in Appendix B of the fact sheet..

The second portion of this provision prohibits the POTW from accepting certain specific types of wastes, namely those which are explosive, flammable, excessively acidic, basic, otherwise corrosive, or obstructive to the system. In addition wastes with excessive BOD, petroleum based oils, or which results in toxic gases are prohibited to be discharged. The regulatory basis for these prohibitions is 40 CFR Part 403, with the exception of the pH provisions which are based on WAC 173-216-060.

The third portion of this provision prohibits certain types of discharges unless the POTW receives prior authorization from the Department. The discharges include cooling water in significant volumes, stormwater and other direct inflow sources, and wastewaters significantly affecting system hydraulic loading, which do not require treatment.

GENERAL CONDITIONS

General Conditions are based directly on State and Federal law and regulations and have been standardized for all individual municipal NPDES permits issued by the Department.

PERMIT ISSUANCE PROCEDURES

PERMIT MODIFICATIONS

The Department may modify this permit to impose numerical limitations, if necessary to meet Water Quality Standards, Sediment Quality Standards, or Ground Water Standards, based on new information obtained from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

The Department may also modify this permit as a result of new or amended State or Federal regulations.

RECOMMENDATION FOR PERMIT ISSUANCE

This proposed permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to protect human health, aquatic life, and the beneficial uses of waters of the State of Washington. The Department proposes that this permit be issued for five (5) years.

REFERENCES FOR TEXT AND APPENDICES

Environmental Protection Agency (EPA)

1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.

1991. Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001.

1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington, D.C.

1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.

1983. Water Quality Standards Handbook. USEPA Office of Water, Washington, D.C.

Metcalf and Eddy.

1991. Wastewater Engineering, Treatment, Disposal, and Reuse. Third Edition.

Tsivoglou, E.C., and J.R. Wallace.

1972. Characterization of Stream Reaeration Capacity. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

Washington State Department of Ecology.

Laws and Regulations(<http://www.ecy.wa.gov/laws-rules/index.html>)

Permit and Wastewater Related Information
(<http://www.ecy.wa.gov/programs/wq/wastewater/index.html>)

Washington State Department of Ecology.

1994. Permit Writer's Manual. Publication Number 92-109

Water Pollution Control Federation.

1976. Chlorination of Wastewater.

Wright, R.M., and A.J. McDonnell.

1979. In-stream Deoxygenation Rate Prediction. Journal Environmental Engineering Division, ASCE. 105(E2). (Cited in EPA 1985 op.cit.)

APPENDIX A -- PUBLIC INVOLVEMENT INFORMATION

The Department has tentatively determined to reissue a permit to the applicant listed on page 1 of this fact sheet. The permit contains conditions and effluent limitations which are described in the rest of this fact sheet.

Public notice of application was published on July 15, 2004 in the Wenatchee World to inform the public that an application had been submitted and to invite comment on the reissuance of this permit.

The Department will publish a Public Notice of Draft (PNOD) on November 11, 2004 in the Wenatchee World to inform the public that a draft permit and fact sheet are available for review. Interested persons are invited to submit written comments regarding the draft permit. The draft permit, fact sheet, and related documents are available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at the regional office listed below. Written comments should be mailed to:

Water Quality Permit Coordinator
Department of Ecology
Central Regional Office
15 West Yakima Avenue, Suite 200
Yakima, WA 98902

Any interested party may comment on the draft permit or request a public hearing on this draft permit within the thirty (30) day comment period to the address above. The request for a hearing shall indicate the interest of the party and the reasons why the hearing is warranted. The Department will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-220-090). Public notice regarding any hearing will be circulated at least thirty (30) days in advance of the hearing. People expressing an interest in this permit will be mailed an individual notice of hearing (WAC 173-220-100).

Comments should reference specific text followed by proposed modification or concern when possible. Comments may address technical issues, accuracy and completeness of information, the scope of the facility's proposed coverage, adequacy of environmental protection, permit conditions, or any other concern that would result from issuance of this permit.

The Department will consider all comments received within thirty (30) days from the date of public notice of draft indicated above, in formulating a final determination to issue, revise, or deny the permit. The Department's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information may be obtained from the Department by telephone, 509/457-7105 or by writing to the address listed above.

This permit and fact sheet were written by Richard A. Marcley.

APPENDIX B -- GLOSSARY

Acute Toxicity--The lethal effect of a pollutant on an organism that occurs within a short period of time, usually 48 to 96 hours.

AKART-- An acronym for “all known, available, and reasonable methods of prevention, control, and treatment”.

Ambient Water Quality--The existing environmental condition of the water in a receiving water body.

Ammonia--Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Average Monthly Discharge Limitation --The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month (except in the case of fecal coliform). The daily discharge is calculated as the average measurement of the pollutant over the day.

Average Weekly Discharge Limitation -- The highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week. The daily discharge is calculated as the average measurement of the pollutant over the day.

Best Management Practices (BMPs)--Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD₅--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD₅ is used in modeling to measure the reduction of dissolved oxygen in a receiving water after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the Federal Clean Water Act.

Bypass--The intentional diversion of waste streams from any portion of a treatment facility.

CBOD5 – The quantity of oxygen utilized by a mixed population of microorganisms acting on the nutrients in the sample in an aerobic oxidation for five days at a controlled temperature of 20 degrees Celsius, with an inhibitory agent added to prevent the oxidation of nitrogen compounds. The method for determining CBOD5 is given in 40 CFR Part 136.

Chlorine--Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic Toxicity--The effect of a pollutant on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean Water Act (CWA)--The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Combined Sewer Overflow (CSO)--The event during which excess combined sewage flow caused by inflow is discharged from a combined sewer, rather than conveyed to the sewage treatment plant because either the capacity of the treatment plant or the combined sewer is exceeded.

Compliance Inspection - Without Sampling--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance Inspection - With Sampling--A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the percent removal requirement. Additional sampling may be conducted.

Composite Sample--A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing a minimum of four discrete samples. May be "time-composite"(collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots).

Construction Activity--Clearing, grading, excavation and any other activity which disturbs the surface of the land. Such activities may include road building, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

Continuous Monitoring –Uninterrupted, unless otherwise noted in the permit.

Critical Condition--The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Dilution Factor--A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the effluent fraction e.g., a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Engineering Report--A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report shall contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal Coliform Bacteria--Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab Sample--A single sample or measurement taken at a specific time or over as short period of time as is feasible.

Industrial User-- A discharger of wastewater to the sanitary sewer which is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

Industrial Wastewater--Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business, from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Infiltration and Inflow (I/I)--"Infiltration" means the addition of ground water into a sewer through joints, the sewer pipe material, cracks, and other defects. "Inflow" means the addition of precipitation-caused drainage from roof drains, yard drains, basement drains, street catch basins, etc., into a sewer.

Interference -- A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal and;

Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to subtitle D of the SWDA), sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

Major Facility--A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum Daily Discharge Limitation--The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Method Detection Level (MDL)--The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is above zero and is determined from analysis of a sample in a given matrix containing the analyte.

Minor Facility--A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing Zone--A volume that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in State regulations (Chapter 173-201A WAC).

National Pollutant Discharge Elimination System (NPDES)--The NPDES (Section 402 of the Clean Water Act) is the Federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the State of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both State and Federal laws.

Pass through -- A discharge which exits the POTW into waters of the-State in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of State water quality standards.

pH--The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

Potential Significant Industrial User--A potential significant industrial user is defined as an Industrial User which does not meet the criteria for a Significant Industrial User, but which discharges wastewater meeting one or more of the following criteria:

- a. Exceeds 0.5 % of treatment plant design capacity criteria and discharges <25,000 gallons per day or;
- b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes).

The Department may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

Quantitation Level (QL)-- A calculated value five times the MDL (method detection level).

Significant Industrial User (SIU)--

- 1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N and;
- 2) Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement (in accordance with 40 CFR 403.8(f)(6)).

Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

*The term "Control Authority" refers to the Washington State Department of Ecology in the case of non-delegated POTWs or to the POTW in the case of delegated POTWs.

State Waters--Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, wetlands, and all other surface waters and watercourses within the jurisdiction of the State of Washington.

Stormwater--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Technology-based Effluent Limit--A permit limit that is based on the ability of a treatment method to reduce the pollutant.

Total Suspended Solids (TSS)--Total suspended solids are the particulate materials in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Upset--An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water Quality-based Effluent Limit--A limit on the concentration or mass of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into a receiving water.

APPENDIX C -- TECHNICAL CALCULATIONS

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on the Department's homepage at <http://www.ecy.wa.gov/programs/wq/wastewater/index.html>

The following spreadsheets are presented in this Appendix:

- Two RIVPLUME5 spreadsheets, used to calculate the chronic and acute dilution factors and the dimensions of the respective mixing zones;
- NH3FRESH.WK1, used to calculate ammonia water quality criteria for the receiving waterbody;
- CRITERIA.XLS, used to calculate water quality criteria of other pollutants of interest present in the discharge;
- REASPOT.XLS, used to determine the reasonable potential for pollutants in the discharge to exceed the aquatic water quality standards, and;
- HUMAN-H.XLS, used to determine the reasonable potential for pollutants in the discharge to exceed the human health water quality standards. Only three pollutants in the permitted discharge, inorganic arsenic, methylene chloride, and bis(2-ethylhexyl)phthalate have human health criteria.

REASONABLE POTENTIAL DETERMINATION

This spreadsheet calculates the reasonable potential to exceed state water quality standards for a small number of samples. The procedure and calculations are done per the procedure in Technical Support Document for Water Quality-based Toxics Control, U.S. EPA, March, 1991 (EPA/505/2-90-001) on page 56.

State Water Quality Standard									Max concentration at edge of...	LIMIT REQ'D?
Metal Criteria Translator as decimal			Metal Criteria Translator as decimal	Ambient Concentration (metals as dissolved)		Acute	Chronic	Acute Mixing Zone	Chronic Mixing Zone	
Parameter	Acute	Chronic	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L		
AMMONIA			2.0000	3690.0	660.0	100.97	28.11	NO		
Effluent percentile value		Max effluent conc. measured (metals as total recoverable)	Coeff Variation		# of samples	Multiplier	Acute Dil'n Factor	Chronic Dil'n Factor		
Pn		ug/L	CV	s	n					
0.95	0.933	6700.00	0.60	0.55	43	1.09	74	279		

CALCULATION OF CHRONIC DILUTION FACTOR (RIVPLUME5)

Spread of a plume from a point source in a river with boundary effects from the shoreline
based on the method of Fischer *et al.* (1979) with correction for the effective origin of effluent.

Revised 22-Feb-96

INPUT	
1. Effluent Discharge Rate (cfs):	4.12
2. Receiving Water Characteristics Downstream From Waste Input	
Stream Depth (ft):	20.00
Stream Velocity (fps):	1.00
Channel Width (ft):	1250.00
Stream Slope (ft/ft) or Manning roughness "n":	0.03
0 if slope or 1 if Manning "n" in previous cell:	1
3. Discharge Distance From Nearest Shoreline (ft):	150
4. Location of Point of Interest to Estimate Dilution	
Distance Downstream to Point of Interest (ft):	315
Distance From Nearest Shoreline (ft):	150
5. Transverse Mixing Coefficient Constant (usually 0.6):	0.6
6. Original Fischer Method (enter 0) or <i>Effective Origin</i> Modification (enter 1)	0
OUTPUT	
1. Source Conservative Mass Input Rate	
Concentration of Conservative Substance (%):	100.00
2. Shear Velocity	
Shear Velocity based on slope (ft/sec):	#N/A
Shear Velocity based on Manning "n":	
using Prasuhn equations 8-26 and 8-54 assuming	
hydraulic radius equals depth for wide channel	
Darcy-Weisbach friction factor "f":	0.038
Shear Velocity from Darcy-Weisbach "f" (ft/sec):	0.069
Selected Shear Velocity for next step (ft/sec):	0.069
3. Transverse Mixing Coefficient (ft ² /sec):	0.832
4. Plume Characteristics Accounting for Shoreline Effect (Fischer <i>et al.</i> , 1979)	
Co	1.65E-02
x'	1.68E-04
y'o	1.20E-01
y' at point of interest	1.20E-01
Solution using superposition equation (Fischer eqn 5.9)	
Term for n= -2	0.00E+00
Term for n= -1	0.00E+00
Term for n= 0	1.00E+00
Term for n= 1	0.00E+00
Term for n= 2	0.00E+00
Upstream Distance from Outfall to <i>Effective Origin</i> of Effluent Source (ft)	#N/A
Effective Distance Downstream from Effluent to Point of Interest (ft)	315.00
x' Adjusted for <i>Effective Origin</i>	1.68E-04
C/Co (dimensionless)	2.18E+01
Concentration at Point of Interest (Fischer Eqn 5.9)	3.59E-01
Unbounded Plume Width at Point of Interest (ft)	91.587
Unbounded Plume half-width (ft)	45.793
Distance from near shore to discharge point (ft)	150.00
Distance from far shore to discharge point (ft)	1100.00
Plume width bounded by shoreline (ft)	91.59
Approximate Downstream Distance to Complete Mix (ft):	581,620
Theoretical Dilution Factor at Complete Mix:	6,067.961
Calculated Flux-Average Dilution Factor Across Entire Plume Width:	444.596
Calculated Dilution Factor at Point of Interest:	278.609

Spread of a plume from a point source in a river with boundary effects from the shoreline
based on the method of Fischer *et al.* (1979) with correction for the effective origin of effluent.

Revised 22-Feb-96

INPUT	
1. Effluent Discharge Rate (cfs):	4.94
2. Receiving Water Characteristics Downstream From Waste Input	
Stream Depth (ft):	20.00
Stream Velocity (fps):	1.00
Channel Width (ft):	1250.00
Stream Slope (ft/ft) or Manning roughness "n":	0.03
0 if slope or 1 if Manning "n" in previous cell:	1
3. Discharge Distance From Nearest Shoreline (ft):	150
4. Location of Point of Interest to Estimate Dilution	
Distance Downstream to Point of Interest (ft):	31.5
Distance From Nearest Shoreline (ft):	150
5. Transverse Mixing Coefficient Constant (usually 0.6):	0.6
6. Original Fischer Method (enter 0) or <i>Effective Origin</i> Modification (enter 1)	0
OUTPUT	
1. Source Conservative Mass Input Rate	
Concentration of Conservative Substance (%):	100.00
Source Conservative Mass Input Rate (cfs*%):	494.00
2. Shear Velocity	
Shear Velocity based on slope (ft/sec):	#N/A
Shear Velocity based on Manning "n":	
using Prasuhn equations 8-26 and 8-54 assuming	
hydraulic radius equals depth for wide channel	
Darcy-Weisbach friction factor "f":	0.038
Shear Velocity from Darcy-Weisbach "f" (ft/sec):	0.069
Selected Shear Velocity for next step (ft/sec):	0.069
3. Transverse Mixing Coefficient (ft ² /sec):	0.832
4. Plume Characteristics Accounting for Shoreline Effect (Fischer <i>et al.</i> , 1979)	
C _o	1.98E-02
x'	1.68E-05
y'o	1.20E-01
y' at point of interest	1.20E-01
Solution using superposition equation (Fischer eqn 5.9)	
Term for n= -2	0.00E+00
Term for n= -1	0.00E+00
Term for n= 0	1.00E+00
Term for n= 1	0.00E+00
Term for n= 2	0.00E+00
Upstream Distance from Outfall to <i>Effective Origin</i> of Effluent Source (ft)	#N/A
Effective Distance Downstream from Effluent to Point of Interest (ft)	31.50
x' Adjusted for <i>Effective Origin</i>	1.68E-05
C/C _o (dimensionless)	6.89E+01
Concentration at Point of Interest (Fischer Eqn 5.9)	1.36E+00
Unbounded Plume Width at Point of Interest (ft)	28.962
Unbounded Plume half-width (ft)	14.481
Distance from near shore to discharge point (ft)	150.00
Distance from far shore to discharge point (ft)	1100.00
Plume width bounded by shoreline (ft)	28.96
Approximate Downstream Distance to Complete Mix (ft):	581,620
Theoretical Dilution Factor at Complete Mix:	5,060.729
Calculated Flux-Average Dilution Factor Across Entire Plume Width:	117.256
Calculated Dilution Factor at Point of Interest:	73.479

Freshwater un-ionized ammonia criteria based on EPA Gold Book
(EPA 440/5-86-001) as revised by Heber and Ballentine (1992).

Based on Lotus File NH3FRES2.WK1 Revised 12-Dec-94

INPUT	
1. Temperature (deg C; 0<T<30):	18.5
2. pH (6.5<pH<9.0):	8.19
3. Total Ammonia (ug N/L):	200.0
4. Acute TCAP (Salmonids present- 20; absent- 25):	20
5. Chronic TCAP (Salmonids present- 15; absent- 20):	15
OUTPUT	
1. Intermediate Calculations:	
Acute FT:	1.1092
Chronic FT:	1.4125
FPH:	1.0000
RATIO:	13.5000
pKa:	9.4488
Fraction Of Total Ammonia Present As Un-ionized:	5.2224%
2. Sample Un-ionized Ammonia Concentration (ug/L as NH3-N):	10.4
3. Un-ionized Ammonia Criteria:	
Acute (1-hour) Unionized Ammonia Criterion (ug/L as NH3-N):	192.7
Chronic (4-day) Un-ionized Ammonia Criterion (ug/L as NH3-N):	34.5
4. Total Ammonia Criteria:	
Acute Total Ammonia Criterion (ug/L as NH3-N):	3,690
Chronic Total Ammonia Criterion (ug/L as NH3-N):	660

REASONABLE POTENTIAL DETERMINATION

				State Water Quality Standard		Max concentration at edge of...								
	Metal Criteria Translator as decimal	Metal Criteria Translator as decimal	Ambient Concentration (metals as dissolved)	Acute	Chronic	Acute Mxing Zone	Chronic Mxing Zone	LIMIT REQ'D?	Effluent percentile value		Max effluent conc. measured (metals as total recoverable)	Coeff Variation	s	# of samples
Parameter	Acute	Chronic	ug/L	ug/L	ug/L	ug/L	ug/L			Ph	ug/L	CV		n
Arsenic (Dissolved)	1.00	1.00		360.00	190.00	0.08	0.02	NO	0.95	0.050	1	0.60	0.55	1
Copper	0.996	0.996		10.68	7.44	6.21	1.63	NO	0.95	0.224	120	0.60	0.55	2
Lead	0.466	0.466		37.56	1.46	0.04	0.01	NO	0.95	0.050	1	0.60	0.55	1
Zinc	0.996	0.996		75.29	68.75	6.43	1.68	NO	0.95	0.050	76	0.60	0.55	1
						#DIV/0!	#DIV/0!	#DIV/0!	0.95	#DIV/0!		0.60	0.55	

APPENDIX D -- RESPONSE TO COMMENTS

Comment:

-----Original Message-----

From: Thompson, Daniel

Sent: Tuesday, November 30, 2004 2:55 PM

To: Huwe, Cynthia

Subject: SWFAP Comments on the Draft Fact Sheet for NPDES Permit No. 002060-5

Cindy:

A few comments on the draft Fact Sheet for the City of Chelan's NPDES Permit No. 002060-5.

Page 11, first full paragraph, sentence 3. "...and land applied at an agricultural site at Boulder Park or King County" should be changed to something such as, "...and land applied at agricultural sites in Douglas County managed by Boulder Park Incorporated (BPI) in accordance with the King County/BPI *Site Specific Land Application Plan*."

Both references to "Chelan-Douglas Health District" should be changed to "Chelan-Douglas Health District"

Thanks for the opportunity to comment!

Daniel Thompson

Regional Biosolids Coordinator

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Departmental Response:

Changes have been made as requested.